



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,998	07/24/2003	Yi-Li Hsiao	67,200-930	3724

7590 04/11/2007
TUNG & ASSOCIATES
Suite 120
838 W. Long Lake Road
Bloomfield Hills, MI 48302

EXAMINER

MACARTHUR, SYLVIA

ART UNIT	PAPER NUMBER
----------	--------------

1763

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/11/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/626,998	Applicant(s) HSIAO ET AL.	
	Examiner Sylvia R. MacArthur	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Arguments

1. Applicant's arguments with respect to claims 1-20 have been considered but are unpersuasive. Applicant argues that the prior art of Akira (JP 9-17770A) fails to teach a method of maintain substrate support at a substantially uniform set point temperature in a reaction chamber upon a rise in temperature of the chamber, comprising the steps as recited in claims 1, 9, and 15. The examiner disagrees and notes that the substrate support 9 of Akira comprise two concentric coolant paths 11 and 14. The temperature of the coolant 14 is lower than the coolant 11 and anticipates the compensation coolant of the present invention, see the constitution page 3 and section [0031] pages 22 and 23.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 9, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Koike Akira et al (JP 9-17770).

Akira et al teaches a plasma process method wherein two refrigeration paths (11 and 14) are provided within a substrate support 9 to offset the radiant heat from chamber walls, see the constitution, path 11 anticipates the compensation temperature while 14 anticipates the main

Art Unit: 1763

coolant temperature, see also Figure 1. The peripheral part of stage 9 is cooled more to offset the inner wall temperature rise, this ensures that the support temperature is substantially uniform.

Regarding claim 9: See Figs. 1a and 1b. Main cooling channels, D1, D2 and E circulate fluid through 14 and compensation channels C1 and C2, circulate fluid through 11.

Regarding claim 15: The channels and compensation loop are illustrated in the Figure representing example 1.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2,4, 6,8, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akira et al.

The teachings of Akira et al were discussed above.

Regarding claims 2,4, 6,8, 10, and 12 : Akira fails to teach that the set point temperature is about 60 degrees C. However, the set point temperature of the chuck is an optimizable parameter based on such factors as type of coolant used and desired final temperature of substrate. The selection of processing parameters such as temperature, in this case, the set point temperature, would have been obvious. The courts have held that it is to be expected to optimize the temperature as an unpatentable modification. If the claimed set point temperature is thought to impart patentability, the expressed temperature should produce a new and unexpected result, in

Art Unit: 1763

this case applicant has the burden of proving such criticality. More particularly, where the general condition, a stage which two independently supplied coolant flow paths wherein 14 is the main coolant and 11 is the compensation coolant) are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. The determination of this processing parameter set point of the chuck temperature is well within the ordinary skill of one in the art to determine in order to maintain the uniform temperature of the support.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to choose a coolant with a set point temperature of about 60 degrees C.

6. Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akira et al in view of Okudaira et al.

Regarding claim 3: The teachings of Akira et al were discussed above. Akira et al fails to teach the cooling temperature as recited in claim 3.

Okudaira et al teaches a dry etching method. According to col. 6 line 33, Okudaira et al teaches the cooling temperature is in the range of 50 to 130 degrees C.

The motivation to provide a coolant at about 50 degrees as taught in the range Okudaira et al is that the temperature of the coolant is an optimizable processing parameter. The selection of processing parameters such as temperature, in this case, the cooling temperature would have been obvious. The courts have held that it is to be expected to optimize the temperature as an unpatentable modification. If the claimed set point temperature is thought to impart patentability, the expressed temperature should produce a new and unexpected result, in this case applicant has the burden of proving such criticality. More particularly, where the general condition, a stage which two independently supplied coolant flow paths wherein 14 is the main coolant and 11 is

Art Unit: 1763

the compensation coolant) are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. The determination of this processing parameter, the cooling temperature is well within the ordinary skill of one in the art to determine in order to maintain the uniform temperature of the support.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a coolant of about 50 degrees as taught within the range of Okudaira et al.

Regarding claim 5: Akira et al fails to teach water as the compensation fluid.

Water is used to maintain the temperature of the specimen stage see col. 6 lines 31-39 of Okudaira et al. The motivation to provide water as the coolant of the method of Akira et al is that water is a low-cost, easily acquired substance and known for its advantageous chemical and physical properties for use as a compensation fluid in heat transfer. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide water as the coolant for the compensation fluid.

7. Claims 7, 11, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akira et al in view of Hideo et al (JP 2003-248322).

The teachings of Akira et al were discussed above.

Akira et al fails to teach the coolant temperature is about 50 degrees C.

Hideo et al teaches a method for producing an original printing plate (a semiconductor manufacturing process). A coolant is used to maintain the temperature of the substrate according to Section [0084]. The coolant temperature is 50 degrees C or less.

The motivation to provide the coolant at that temperature is that it is suggested by Hideo et al that 50 degrees C or less provides the optimal heat transfer for optimal temperature control of the wafer.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the method of Akira et al with the teachings of Hideo to provide the coolant at 50 degrees C as it provides optimal heat transfer.

Additionally, the selection of processing parameters such as temperature, in this case, the coolant temperature, would have been obvious. The courts have held that it is to be expected to optimize the temperature as an unpatentable modification. If the claimed set point temperature is thought to impart patentability, the expressed temperature should produce a new and unexpected result, in this case applicant has the burden of proving such criticality. More particularly, where the general condition, a stage which two independently supplied coolant flow paths wherein 14 is the main coolant and 11 is the compensation coolant) are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. The determination of this processing parameter, the coolant temperature is well within the ordinary skill of one in the art to determine in order to maintain the uniform temperature of the support. Thus, it would have been obvious for one of ordinary skill in the art to choose a coolant with a temperature of about 50 degrees C and a set point temperature of 60 degrees C.

8. Claims 13,14, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akira et al in view of Long et al (US 6,608,352).

The teachings of Akira et al were discussed above.

Akira et al fails to teach a p-n junction module.

Art Unit: 1763

Long et al teaches a chuck 208 coupled to a temperature controller 210 a p-n junction current meter 214 is coupled between the p-n junction formed by the first doped region 204 and the drain region 156, see col. 6 lines 9-48.

The motivation to provide a p-n junction module is that it provides a mechanism for determining the thermal resistance of a substrate in an easy yet accurate manner.

Regarding claim 17: A main temperature characteristic curve is seen in Fig. 5. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the method of Akira et al to provide a pn junction module to determine the thermal resistance of the substrate and thus enhance process control.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

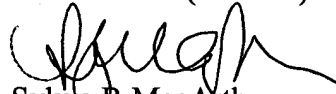
Art Unit: 1763

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438.

The examiner can normally be reached on M-F during the hours of 8:30 a.m. and 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sylvia R. MacArthur
Patent Examiner
Art Unit 1763

April 9, 2007